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Field Trip Report – Long Puah's Kindergarten Solar System Installation & Long Lamai's Telecentre Solar System Troubleshooting

Date of visit: 6th – 11th July 2015
Researcher(s): Assoc. Prof. Dr. Tan Chong Eng, Dr. John Phoa Chun Leong, Mohd. Azizul Hafiz b Jamian, Yusri bin Jumat, Wong Siew Mooi,and Sandy.
Venue/Place: Long Puah and Long Lamai
Reported by: Yusri bin Jumat
Reviewed by: Prof. Dr. Alvin Yeo Wee

Objective(s) of the visit

1. **To do Solar System installation at Long Puah's Kindergarten**
2. **Long Lamai Telecentre Solar PV power system inspection and troubleshooting**
3. **GIS Mapping for Long Lamai Tourism**

Programme/Activities

Summary:

6th July 2015, Monday.

Flight from Kuching to Miri departed at 6.45 am and arrived at Miri at around 8.30 am. Before proceeding with the journey to Long Puah, went to Boulevard Miri to buy some food supply for 1 week stock for Long Puah and Long Lamai. Then, took nearly 6 hours journey using logging road by 4WD vehicle to Long Sengong jetty. The journey by Sungai Ulu Tinjar to Long Puah from Long Sengong jetty took around 30 minutes by using motorboat. Due to the dry season, the river water level was not very deep and sometimes boats need to be manually pushed without using the motor because the motor propeller will hits rocks in the river. Reached Long Puah around 5.45 pm.

In the evening, did some investigations of the Installed Solar System at their longhouse and their feedback was the system still in good condition after 1 year installed and it was their effort too because everyone take good care of it and still maintained the needs of saving the energy in using electrical appliances.

Actually, our purpose in Long Puah was to migrate one of the existing Solar System Unit from the long house to a newly built kindergarten building next to the long house. Mr Simon Tsai (the previous lighting project contractor) had kindly donated one unit of the solar system Due to the donation, the objective was changed instead of migrating one existing solar system at the long house to a kindergarten, to install a new solar system at the kindergarten.

7th July 2015, Tuesday.

At around 8.30 am started to prepare tools and the system to be installed at the kindergarten. The system had 8 bulbs, 5 switches, 1 solar panel and 1 dry cell battery. The installation process also involved with the local community in order for them to know how to do wiring and installation of the system. After they knew how to do it, they will do the wiring for the kindergarten's toilet since it is not yet being built but it was in their plan. First was installing the solar panel on the roof of the kindergarten. Then did the wiring and bulb installation. Finally installed the battery and its casing.

After complete all the installation at 6.00 pm, we tested the system and it function very well thus the wiring was in correct order. Dr Tan had program the system to function only for night time in order to save energy during daytime plus charging the battery. At around 8.30 pm we had short discussion and brief explanation with the villagers about the solar system at the kindergarten and their long house. From their feedback, they were 2 broken ON/OFF switches due to wear and tear. The switches had been replaced by us after that.

Diagram 1: Dr Tan teach the local community to do wiring for solar system in kindergarten.

Digram 2: Local community try to do solar system wiring

Diagram 3: The kindergarten in red roof

Diagram 4: The researcher with the local community at their longhouse

Digram 5: The kindergarten during night time with the solar system in 'ON' position.

8th July 2015, Wednesday.

At around 8.30 am we moved out from Long Puah by motorboat and arrived at Long Senggong jetty at around 9.00 am. We continued our journey by 4WD vehicle to Long Puak jetty in order to go to Long Lamai by motorboat. The 4WD ride was 8 hours from Long Senggong jetty to Long Puak Jetty, we arrived at around 5.00 pm and in between the journey we had lunch at Kilo 10. Then from Long Puak jetty, it took us 1 hour to arrive at Long Lamai which was around 6.00 pm. Our objectives at Long Lamai were:

- To investigate the failure of the power system for solar system at Telecentre
- To do mapping in GPS for paddy field and hiking routes

There was no electricity for the villagers during night time due to not enough power from the upper stream to drive the micro-hydro power system at the downstream to generate the electricity, which was related to the dry season.

Diagram 6: The researchers with the local community after motorboat ride and continue with 4WD vehicle ride.

9th July 2014, Thursday.

At around 9.00 am, Dr Tan and I investigated the condition of the batteries at the power house. Most of the batteries were worn out and died after being tested using Multi Meter. Moreover, the charge controller output was tested and the output was same as displayed. Then, the Voc for the PV panel was also tested and the output was same as its specification.

In order to make the telecentre wifi function again, we rearranged the battery by selecting and series connection of the good batteries and linked those to charge controller to make the battery restore

power again from the solar system. While waiting for the selected battery to restore its energy, Garren has found keys to open the cabinet box that stored batteries, charge controller and inverter for the previous solar power system by Maxis for powering the previous VSAT system in the early years of the Telecentre.

It has 4 batteries that were in good condition as the voltage for each battery was 12V (optimal voltage). The charge controller was also in good condition where the battery still got its power from it but the power inverter was faulty. Due to the power inverter which was faulty, the whole solar system did not complete and couldn't supply power to the VSAT system and its need to get power source from the main Telecentre solar power.

As the 4 batteries from the previous solar system was much better than the batteries in power house, we decided to change the batteries in the power house with those batteries. Furthermore, the tryout to charge the power house battery earlier on had failed because the batteries still couldn't store the power. After the replacement of the batteries, the power supply to the Telecentre had been restored with only 1/5 of its initial backup capacity. The 4 batteries were connected in series in order to get the 48VDC output voltage.

The power from the solar system had been agreed to only be used to power up VSAT modem and WiFI equipment only due to the current power constraint situation. The other electrical appliances such as lighting, ceiling fans, and etc shall not be powered up until we get the reliable power from new battery replacement being done. .

We did not get the power source from the micro-hydro system to power up the WiFI and Modem mainly because it's very large voltage fluctuation (90 VAC to 200VAC). The fluctuation could damage the sensitive electronics parts in the IT equipment.

Diagram 7: The researchers check the battery in power house

Diagram 8: The process of replacing the battery

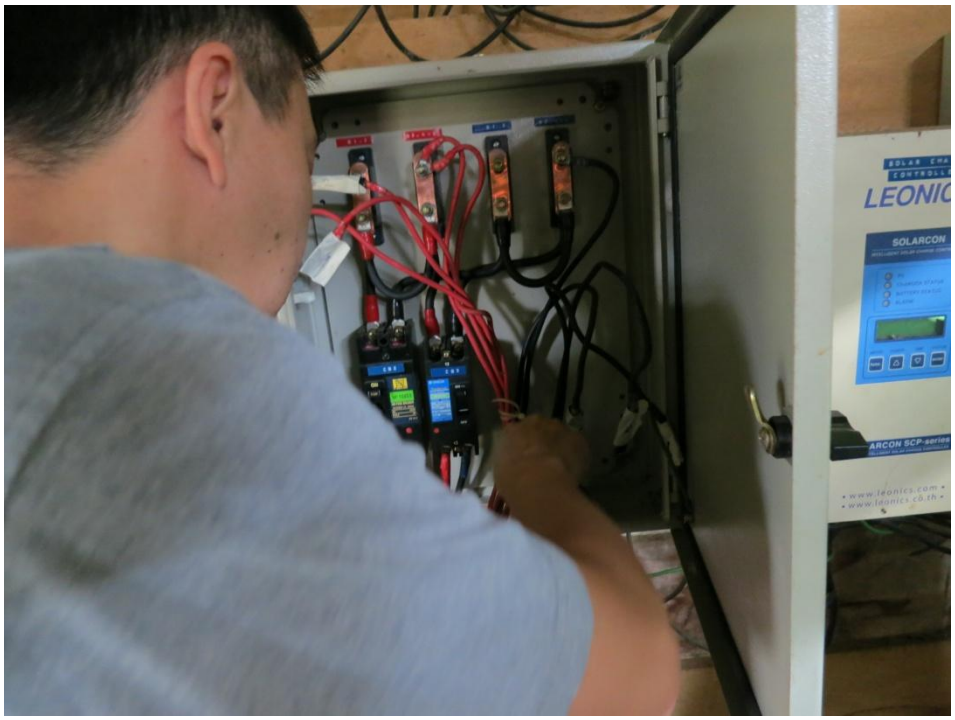

Diagram 9: Dr Tan did the installation of new battery

10th July 2015, Friday.

For the second objective, Dr. John and Azizul needed to do mapping using GPS for the local paddy field and survey the hiking routes suggested by local community for tourism. This activity needed them to do jungle trekking and will took around 6 hours to arrive at the attractive site for tourism.

At around 10.00 am with the help from a local guide named Gayut, we all except Sandy went to the

jungle and started our journey of jungle trekking. Along the way, Gayut explained the names, types, and functions some of the plants, trees, and herbs. He also showed us some of the traditional Penan sign language 'Oroo' by using leaves and branches of trees in the jungle.

Even though we did not arrive at the site suggested by Gayut after taking 6 hours journey, Dr. John and Azizul managed to get GPS mapped for some of the trekking routes. We arrived at our homestay at around 5.00 pm.

At night, around 8.00 pm, Dr. John met up with the community who involved in selling their handicrafts and did the payment for their selling. Most of the handicraft being sold in Kuching and outside Kuching. Not all of the handicraft will being sold, some of its being rejected and returned back because of minor error. This program was initiated by Faculty of Applied and Creative Arts, UNIMAS with the collaboration from the women community in Long Lamai. This project has brought some income to them.

Diagram 10: Some of the findings in the jungle during jungle trekking

Diagram 11: Researchers with Gayut during the jungle trekking

11th July 2015, Saturday.

At around 8.30 am we moved out from Long Lamai by using motorboat back to Long Puak and Long Banga. For those who take flight will stop at Long Banga because there is an airport and for those who use 4WD vehicle will stop at Long Puak. The journey by motorboat was 1 hour 35 minutes to Long Banga and 1 hour for those who stop at Long Puak. At Long Puak to Miri, it took around 7 hours by 4WD vehicle and from Long Banga to Miri airport, it took 1 hour journey by Twin Otter flight.

Personal Experiences and Observations

Site Observation and Conclusion

Long Puah

1. The kindergarten solar system for lighting system was successfully installed and function in correct order.
2. Even though the wiring was 'Wiring Kampung' and not standard as being done by the competent person, the safety element still being concerned during the wiring process and also the solar system itself as it has fuse if the current suddenly high up.

3. After being guided to do wiring, two of the local person will do the wiring for kindergarten's toilet as we will not be in Long Puah when the toilet finished being built.
4. The future for Long Puah's kids is in good condition since there is a kindergarten for them and also a teacher for them to learn from the early stage.

Long Lamai

1. The power system for the telecentre has been resolved as the old battery being replaced with the batteries from the previous solar system for VSAT.
2. The problem of the old batteries unable to charge fully was due to the high self-discharge rate of the worn-out batteries.
3. The batteries have reached the end of their life expectancy.
4. Even though the battery from the VSAT are older than the battery from the power house, those still in good condition and still maintaining their power because the batteries not still charging if those received power from the panel.
5. Need more than one person to lift the batteries because the weight for one battery is more than 50 Kg.
6. For the mapping project, as suggested by the local guide, Gayut, we will need to stay in the jungle one night before continue the journey to the suggested site because if try to finish it by day, it will take more than 10 hours as we calculated the time to hike to the jungle and also going down from the jungle to the village.
7. The local Penan people knew a lot of jungle knowledge and we need them to assist us to do the mapping even though we have high technology device to do it.
8. If the mapping project is successful, the economy in Long Lamai will increase as it will attracts tourist to come to Long Lamai. They will do the jungle trekking to discover the attractive site and the other businesses such as homestay and renting boat will also effecting in a good way.
9. For the micro-hydro power system, it needs more improvement as sometimes it may not supply the electricity to the village due to the water pressure is low by the natural reason for example dry season or leaves block the water entrance to the generator.
10. There is needs for the people to have internet access and power system in Long Lamai by off grid as the Utilities Company will still not supply the electricity and telecommunication to them by the next 5 years.